Compliance Monitoring Data Collection
Specifications and Guidelines
Western Washington

OVERVIEW AND CONTACT INFORMATION

This packet serves as instructions and quick reference for the Compliance Monitoring field data collection. If you have any questions, contact the Compliance Monitoring Program. This information was pulled from the following sources: the "Initial Compliance Monitoring Study Program: State of Washington Forest Practices Rules, Draft Proposal, May 14, 2006," by Leslie Lingley, Forest Practices Rules and Board Manual, and current and archived Forest Practices Applications Instructions. Please read the Draft Proposal to get a detailed overview of the Program and work to be conducted on the Forest Practice Application (FPA) reviews.

Program contacts:

Leslie Lingley, Compliance Monitoring Program Manager
Forest Practices Division
leslie.lingley@dnr.wa.gov
Office: (360) 902-2138
Cell: (360) 789-4330

Compliance Monitoring Field Coordinator
Forest Practices Division
Office: (360) 902-1680
Cell: (360) 789-1432

RESPONSIBILITIES OF FOREST PRACTICE FORESTERS (FPFs) AS LEADERS FOR FIELD REVIEWS

1. Review the field schedule and confirm the participation of DOE and DFW participants by email to confirm field dates.
2. Give the landowner a courtesy call with the dates that you will be reviewing his (her) application.
   a. The Landowner may attend the assessment; however, no information can be taken into account other than what is presented on the approved FPA.
3. Make sure that consistency is maintained throughout the field season, and at each site.
4. Use the field notes templates provided to document findings for all of the riparian assessments.
5. Assure that the FPF who approved the original application will not participate in making decisions for that site.
6. Assure that the FPF that approved the FPA provides site directions and logistical information.
7. Be sure that the prescribed field methods are being used consistently.
8. Work with other FPFs to perform the assessment surveys according to the established protocol.
9. Try to coordinate field days consecutively so that DOE and DFW can optimize their field days and hotel accommodations.
10. Assure that the necessary items are brought to the field including all pre-survey information.

RESPONSIBILITIES OF DOE AND WDFW PERSONNEL

1. Respond to scheduling requests for field days in a timely manner.
2. If you are unable to attend a scheduled field day, attempt to find a replacement from your respective agency.
3. Come prepared with at least the following field gear and supplies:
   a. Field vest: paper, pencils, permanent pen/paint pen, and loggers tape with diameter measurement. Bring laser range finder, two way radios, etc., if you have them available to you.
   b. Any items requested by the Lead DNR person, if you have them available to you.
   c. DNR lead should supply and/or coordinate supply of flagging and other necessary field items.
4. Participate in field measurements following the Specifications and Guidelines and instructions from DNR Lead.
   a. If you have concerns over how the field work is being conducted, discuss with DNR Lead and consult Specifications and Guidelines.
5. Provide constructive discussion of the questions in the field forms.
6. If there is disagreement about the rule, consult the rule book along with constructive discussion of the rule in question.
7. The DNR Lead has the final call on field procedures and answers on the field forms. It is up to the DNR Lead to be accountable for accuracy and consistency of the field work.
8. If you have any concerns that aren't being fulfilled by the DNR Lead, please contact the Program Field Coordinator or Program Manager.

NECESSARY FIELD ITEMS

1. Field notes templates
2. Pencils
3. Calculator
4. Scale ruler
5. Flagging
6. Forest Practice Application to be reviewed
7. Pertinent information included in file, but not in FPARS
8. Any approved Watershed Analysis prescriptions that may apply to the FPA
9. Applicable field forms
10. Site class map for applications with bordering Type S or F Waters
11. Logger's tape, string box, and/or laser range finder and reflector if needed
12. Diameter tape or Biltmore stick
13. Clinometer
14. Camera
15. Forest Practices Rule book for truck

FIELD METHODS AND MEASUREMENT REQUIREMENTS

Measurement Protocols

1. Choosing Riparian Management Zones (RMZ's), Wetland Management Zones (WMZ's), and Equipment Limitation Zones (ELZ's) activities to be sampled.
   a. *Each different activity type on the FPA will be reviewed*. Only one stream segment associated with each activity type will be assessed. For example, if an FPA has two Option I harvests and one Option II harvest, only **one** Option I harvest will be chosen along with the **one** Option II harvest. This is also the case for Type Np and Type Ns harvests.

b. *For FPA's with Type S or F segments*, choose the first cardinal or numerical designator (i.e. "A" or "1").
c. *For segments with double sided RMZs,* survey both sides or as designated by FPA in (b) above.
d. *For stream segments or water bodies without designators:* choose the stream or water body furthest to the North and/or East within the activity area, regardless of unit number.
    i. Some streams may **be** the harvest unit boundary. If this occurs and it is the only stream to review (not one with a letter or number designation), survey this stream.
e. *For surveys along Type S or F water with no Inner Zone management:* survey entire length or perimeter within the same site class as shown on the FPARS site class maps, including branches of the same stream system.
f. *For surveys along Type Np or Ns water:* survey entire length, including branches of the same stream system.

2. USE FIELD NOTES TEMPLATES TO RECORD NECESSARY STAND INFORMATION:

    a. These are in Excel file "WWA Field Notes Templates.xls".
    b. Use these to record information for numbers 3-10, below.
        i. Clarification: the field notes templates are to keep track of tree tallies, stream measurements, etc., while conducting the field work. In turn, these are used to help answer questions on the Field Forms once the field work is done.
    c. Fill in all required information.

3. Stream lengths, widths, and types

    a. Stream length (photo or map verified) within 10% is accepted as correct. If the difference is > 10%, measure in field with a string box, loggers tape, or laser range finder.
    b. Stream width is BFW or CMZ as defined in the Rules and described in Board Manual 2: Standard Methods for Identifying Bankfull Channel Features and Channel Migration Zones.
        i. See 4(a) and (b) below for measurement increments.
        ii. For channels that are obviously greater or less than 10 feet in Western Washington, bankfull width measurements are **not necessary**. For channels that are not obviously discernible, bankfull width should be measured with at least 10 evenly spaced measurements over a representative section of at least 500 feet.
        iii. Concurrently measure the CMZ width on streams that satisfy the criteria above as you measure the RMZs.
    c. Note in field forms if BFW, CMZ, or stream type is incorrect and why.
    d. Measuring buffer widths will be completed **per the approved application** stream characteristics and types.

4. Laying out buffer widths

    a. Measured with a string box, logger's tape, or laser range finder.
    b. Measurements: measure and flag appropriate buffer widths at perpendicular/equal angles from stream.
        i. First measurement is 0+00 at one end of stream (you choose and write in notes) segment as mapped in FPA.
        ii. Every 50 feet for steam segments under 500 feet.
            A. 0+25 is second measurement
        iii. Every 100 feet for stream segments over 500 feet.
            A. 0+50 is second measurement.

iv. If terrain, brush, blow down, etc., doesn't accommodate above stationing, use what works for visibility and NOTE IN FIELD NOTES WHAT THESE DISTANCES ARE. IF MEASURING BFW, YOU MUST STILL FOLLOW STATIONING IN ii or iii above.

c. Overlapping RMZs: also see diagrams on page 15.
   i. Continue flagging across overlapping RMZ's
   ii. Trees in these overlapping areas count towards the leave trees for each stream in its respective RMZ.

d. Flagging
   i. Choose your own color(s).
   ii. Use different colors for different zones/width measurements.
   iii. Write color choices in notes.
   iv. Write station and date on flagging

5. No harvest buffers for all water types:

   a. Includes Core, Option 2 Floor Zone, no Inner Zone Harvest, no harvest Np buffers, or otherwise no harvest buffer.
   b. Between every station, determine if there were trees harvested within the no harvest buffer.
      i. Between appropriate stations in field notes record:
         A. Numbers of trees cut.
         B. Approximate size, when appropriate.
         C. Distances from BFW.
         D. A through C apply to all trees cut within no harvest buffer, including those within the 5% measurement uncertainty (see (b)(ii) below).
         E. With regard to 'exceeds' category (also see 'Compliance Determinations on Field Form #14' heading, number 2(a) on page 6).
            I. Record buffer widths when the buffer is 20% greater than the rule requirement.
            II. Np stream buffers: record up to 20% more than the length that is required by rule. For example, a landowner would exceed the rule if the required length of Np no cut buffer is 500 feet and the landowner leaves additional 100 feet of buffer (20% X 500').
            III. (I) and (II) don't apply when other rules require a greater buffer than the RMZ or WMZ rule (i.e. bounding out of unstable slopes).
      ii. When answering the questions on the field forms:
         A. Trees cut inconsistently within the 5% measurement uncertainty puts the activity **in compliance, so be sure to differentiate these from trees outside of the 5% measurement uncertainty**.
         B. Trees cut consistently within the 5% measurement uncertainty puts the activity **out of compliance**.

6. DFC Option 1, Thinning From Below:

   a. Tally 100% of the Inner Zone trees listed in the DFC print out as leave tree requirements by 2 inch dbh class.
   b. Tree diameters can be measured with either a diameter tape or a Biltmore stick.
   c. Check for stumps that appear to have been trees of dbh larger than the thinning strategy allowed.

7. DFC Option 2, Leaving Trees Closest To Water:

    a. Tally trees cut in "no harvesting allowed" designation from the DFC print out (aka "floor zone") (see number 5, above).
    b. Tally required tree count in the outer portion of Inner Zone, per DFC print out
        i. See notes templates for Option 2.
        ii. Trees must be at least 12 inches in diameter or next largest size available. These are not by size class.
        iii. Tree diameters can be measured with either a diameter tape or a Biltmore stick.
        iv. With regard to "exceeds" category: after counting required number of leave trees, count extra trees until you have reached twice the requirement.
8. Outer Zone:

    a. Tally the outer zone trees until the appropriate numbers of trees have been counted.
        i. See "Outer zone riparian leave tree requirements" table.
        ii. For Option 1 or No Inner Zone Harvest, calculate 20 trees per acre.
        iii. For Option 2, follow DFC specifications in FPA.
        iv. For large woody debris placement strategy exchange, see approved plan in FPA.
        v. For CMZ exchange, see exchange ratios under 'Rules and Rule Clarifications', WAC 222-30-021(1)(c)(iv)(B).
            A. Tally 100% of the CMZ trees: conifer tally must be greater than or equal to 6" dbh and hardwood tally must be greater than or equal to 10" dbh.
    b. With regard to "exceeds" category: after counting required number of leave trees, count extra trees until you have reached twice the requirement.

9. Salvage in Riparian Management Zones:

    a. Lay out RMZs where salvage occurred per the FPA (see number 4 on page 3).
    b. Core Zone and/or CMZ:
        i. Tally any downed trees salvaged that originated from the Core Zone or CMZ, even if any portion of it lies in the Inner or Outer Zones.
    c. Inner Zone:
        i. DFC worksheet must be included with FPA for salvage of stumps, snags, and/or down wood.
            A. Don't verify DFC on the ground if there is no salvage evidence of recently downed trees (i.e. blow down salvage).
            B. Verify DFC if there is salvage evidence of recently downed trees (see number 6 or 7).
        ii. Tally 100% of remaining down wood when salvage of down wood has occurred.
            A. See notes template for salvage.
            B. See table for down wood requirements under 'Riparian and Wetland Management Tables' on page 14.
    d. Outer Zone:
        i. If there is salvage evidence of recently downed trees, Outer Zone leave trees must be counted.
            A. See number 8 above.

10. Wetland Management Zones:

    a. Verify wetland type and size: see wetland definitions and WMZ table under "RULES AND RULE CLARIFICATIONS" section starting on page 8. This can be done concurrently with WMZ measurement.

b. Measure the WMZ per the wetland **as typed in the approved FPA**.
c. If the FPA specifies a set (not average) WMZ width with no harvesting, follow steps 4 and 5, above.
d. For harvest in the WMZ with a variable width buffer:
    i. Follow the boundary as marked on the ground by the applicant.
    ii. Calculate WMZ acreage:
        A. Measure variable widths and distances of the WMZ and put in notes template.
            I. These will be used for estimating WMZ acreage and checking for width and spacing of openings in WMZ.
        B. OR use a GPS to traverse the WMZ and calculate acreage.
    iii. Tally 100% of the trees in the WMZ.
        A. See notes template for WMZ (by diameter category).
        B. Calculate trees per acre of each rule requirement:
            I. 6 to 12 inches dbh trees
            II. Greater than 12 inches dbh trees
            III. Greater than 20 inches dbh trees
    iv. If the WMZ as laid out by the applicant does not have either 25 TPA greater than 12 inches dbh or 5 TPA greater than 20 inches dbh, you must check the maximum WMZ per the Wetland Management Zones table for trees and/or stumps that would fall into these categories.

11. <u>Non buffered portions of Type N streams:</u>

a. Look for equipment entry into the 30 foot equipment limitation zone (ELZ).
b. If yes to a, above, look for 10% soil exposure and/or mitigation for soil exposure.

12. <u>Roads</u>

a. Review all new construction and maintenance roads listed on the FPA.
    i. New construction or roads with maintenance activity will be driven or walked for the entirety of the activity.
    ii. Where roads are utilized for multiple applications such as main haul routes, review the road as is and note this in the comment section.
    iii. Review up to a total of 2500 feet of road abandonment spurs or road segments as listed on the FPA.
        A. If there are multiple abandonment sections to be reviewed, start with the segments furthest north and/or east on the application.

COMPLIANCE DETERMINATIONS ON FIELD FORM #14

Draft Definitions for making determinations for compliance and professional judgment levels of non compliance

1. Status of Compliance:

The categories listed below were used to describe the status of compliance. The criteria defining these categories were developed in concert with representatives of the Forest and Fish policy group. The descriptors have been modified as the program has developed this year.

a. ***Exceeds Rule*:** Landowners conducted their forest practice activities above the minimum requirements of the rule. **IMPORTANT:** An activity can't exceed the rule if there is any out of compliance for any portion of rule requirement for the total RMZ being evaluated. For example, if twice as many trees are left in the Inner Zone than is required by the DFC print out, but there weren't enough required Outer Zone leave trees, the activity is still out of compliance. Examples include:
   i. Type S or F: Twice as many leave trees as required by the rule or DFC worksheet in the Inner and Outer Zones of RMZs.
   ii. Type S, F, or Np: 20% greater no harvest buffer width than what is required by rule.
   iii. Type Np: 20% greater length of no cut buffer on Np stream system.
      A. This length must be a 50 foot no cut buffer to count as exceeds when it is 20% longer than what is required.
      B. If it is an average width no harvest buffer that falls below 50 feet wide and is more than 20% longer, calculate the acreage to determine if it is 20% greater in acreage than that of what is required by the rule.
   iv. No harvest zones are preserved in areas the applicant originally had planned to harvest.
   v. No harvest zones that otherwise could have been harvested under the rules.
   vi. Road improvements beyond those required by rule were employed.
   vii. Road abandonment that included more than required such as mulching, distribution of trees and woody debris along the road prism to deter off road vehicle travel.
   viii. Swales, erroneously defined as typed channels that were protected.

b. ***Compliant:*** Meets protection identified in the FPA and rules.

c. ***Out of compliance:*** Non-compliance with the Rules. Examples include:
   i. Harvest in Riparian Management Zones (RMZs) beyond the pre-determined 5% measurement uncertainty protocol. See the DNR-FP-CMP. Document.
   ii. Leave tree requirements not met.
   iii. Water-crossing structures inadequate for stream protection standards.
   iv. Stream width greater than 10 feet wide, but FPA stated it is less than 10 feet wide, affecting the width of the Inner Zone.
   v. Stream length as reported on the Desired Future Condition (DFC) worksheet that deviated more than 10% of the distance measured in the field.

2. Professional Judgment utilized for Non-Compliance-Levels:

You can substitute the categories in parentheses if it helps you make a decision when trying to define this subjectivity. The examples given for each category are not all inclusive or exclusive. Use the group's best professional judgment based on the actual field measurements and conditions relative to the rule requirements. The following dictionary definitions for these categories help to characterize these determinations. Examples are provided to put some perspective to the Compliance Monitoring program.

a. ***Trivial****: Unimportant, insignificant, trifling, commonplace*. Minor impacts of short duration over a small area. Examples include:
    i. Evidence of slight sediment delivery that does not appear to be persistent.
    ii. A few trees cut in the Inner or Outer Zone of the RMZ of the same or lesser ecological significance as the remaining RMZ trees.

b. ***Apparent****: Readily understood, evident, obvious*. Potential impacts to resources, but generally of moderate effect. Examples include:
    i. Required leave trees for the Outer Zone trees not attained.
    ii. Culvert sizing is questionable, but potential impact to resources is not readily apparent.
    iii. Soil stabilization has not occurred and there may be a potential for future impacts.

c. ***Major***: *Greater in size, amount, number or extent*. Damage to public resources is evident or the potential for damage is high. (These include situations normally referred to the Region). Examples include:
    i. Harvest in the Core Zone. (These include situations normally referred to the Region.)
    ii. Harvest in areas not delineated on the FPA.
    iii. Roads built without an FPA.
    iv. Evidence of direct sediment delivery to typed water that appears to have been persistent.

No consensus: This is used when the participants can't agree on the compliance level. If this is the case, the Forest Practices Forester makes the determination. It is important to note that these professional judgment non-compliance levels do not have statistical validity nor should they be used to excuse forest practice activities that violate the rules or the approved application.

RULES, DEFINITIONS, AND RULE CLARIFICATIONS

THE FOLLOWING IS FROM WAC 222-16:

"Bankfull depth" means the average vertical distance between the channel bed and the estimated water surface elevation required to completely fill the channel to a point above which water would enter the floodplain or intersect a terrace or hillslope. In cases where multiple channels exist, the bankfull depth is the average depth of all channels along the cross-section. (See board manual section 2.)

"Bankfull width" means:

(a) For streams - the measurement of the lateral extent of the water surface elevation perpendicular to the channel at bankfull depth. In cases where multiple channels exist, bankfull width is the sum of the individual channel widths along the cross-section (see board manual section 2).

(b) For lakes, ponds, and impoundments - line of mean high water.

(c) For tidal water - line of mean high tide.

(d) For periodically inundated areas of associated wetlands - line of periodic inundation, which will be found by examining the edge of inundation to ascertain where the presence and action of waters are so common and usual, and so long continued in all ordinary years, as to mark upon the soil a character distinct from that of the abutting upland.

WAC 222-30-021(1)(c)(iv): **Outer Zones, Twenty riparian leave trees must be left after harvest** with the exception of the following:

(A) If a landowner agrees to implement a placement strategy, see (iii) of this subsection.

(B) If trees are left in an associated channel migration zone, the landowner may reduce the number of trees required to be left according to the following:

(I) Offsets will be measured on a basal area-for-basal area basis.

(II) Conifer in a CMZ equal to or greater than 6" dbh will offset conifer in the outer zone at a one-to-one ratio.

(III) Hardwood in a CMZ equal to or greater than 10" dbh will offset hardwood in the outer zone at a one-to-one ratio.

(IV) Hardwood in a CMZ equal to or greater than 10" dbh will offset conifer in the outer zone at a three-to-one ratio.

WAC 222-16-035 Wetland typing system. *The department in cooperation with the departments of fish and wildlife, and ecology, and affected Indian tribes shall classify wetlands. The wetlands will be classified in order to distinguish those which require wetland management zones and those which do not. Wetlands which require wetland management zones shall be identified using the following criteria:

*(1) **"Nonforested wetlands"** means any wetland or portion thereof that has, or if the trees were mature would have, a crown closure of less than 30 percent.

(a) **"Type A Wetland"** classification shall be applied to all nonforested wetlands which:

(i) Are greater than 0.5 acre in size, including any acreage of open water where the water is completely surrounded by the wetland; and

(ii) Are associated with at least 0.5 acre of ponded or standing open water. The open water must be present on the site for at least 7 consecutive days between April 1 and October 1 to be considered for the purposes of these rules; or

(b) **"Type B Wetland"** classification shall be applied to all other nonforested wetlands greater than 0.25 acre.

*(2) **“Forested wetland”** means any wetland or portion thereof that has, or if the trees were mature would have, a crown closure of 30 percent or more.
*(3) “All forested and nonforested bogs” greater than 0.25 acres shall be considered Type A Wetlands.
*(4) For the purposes of determining acreage to classify or type wetlands under this section, approximate determination using aerial photographs and maps, including the national wetlands inventory, shall be sufficient. In addition, the innermost boundary of the wetland management zone on Type A or B Wetlands may be determined by either of two methods: Delineation of the wetland edge, or identifying the point where the crown cover changes from less than 30 percent to 30 percent or more.

THE FOLLOWING IS FROM BOARD MANUAL SECTION 2 STANDARD METHODS FOR INDENTIFYING BANKFULL CHANNLE FEATURES AND CHANNEL MIGRATION ZONES

1.2 Identifying Bankfull Width and Bankfull Depth

The edge of the bankfull channel typically corresponds to the start of the floodplain. A floodplain receives floodwaters in most years, but is generally vegetated by perennial plants and trees. This vegetation often reflects repeated flow-related disturbance and may not support mature trees. The following primary indicators are used to characterize the start of the floodplain:

- **Topography** - A berm or other break in slope from the channel bank to a flat valley bottom, terrace or bench;
- **Vegetation** - A change in vegetation from bare surfaces or annual water-tolerant species to perennial water-tolerant or upland species; and
- **Sediment Texture** - A change in the size distribution of surface sediments (e.g., gravel to fine sand) (Figure 1).

Field determination of the bankfull channel edge generally relies on two or more of the following:

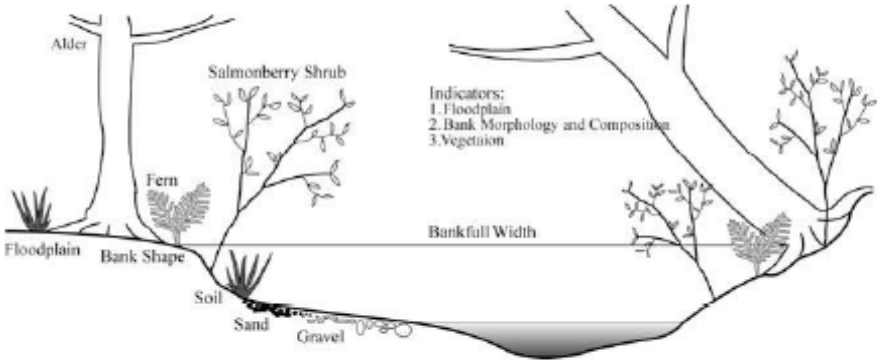


Figure 1. Indicators for determining bankfull width (adapted from Pleus and Schuett-Hames, 1998).

If physical obstructions, such as log jams, or a lack of indicators prevent accurate identification of the bankfull width at a particular point, move to the nearest place where identification is feasible. In cases where the outer edge of the bankfull width is easier to determine on one side of the channel than the other, simply identify the bankfull width on one side and project across at that same elevation to the other bank.

In streams where the substrate is dominated by boulders or bedrock or where the channel is tightly confined, a distinct floodplain may not exist. In these situations, you will have to rely on secondary indicators, such as vegetation or other evidence of flood flows to determine the bankfull width. These indicators may include:

- A change in vegetation from bare surfaces or annual water-tolerant species to perennial upland or water-tolerant shrubs and trees;
- Bare areas associated with scour around woody debris or other obstructions;
- The top of point bars; or
- The lowest elevation at which fine organic debris is caught on brush or trees.

One approach to help identify the bankfull edge is to evaluate the indicators discussed previously from within the bankfull channel looking towards the suspected bankfull edge. Identify the point

where the certainty of being within the bankfull channel is less than 100%. Then, repeat this process, but begin on the floodplain and work towards the channel. This exercise should help narrow the focus to the area between the two markings where more subtle indicators of the bankfull edge may be found (Pleus and Schuett-Hames, 1998).

1.3 Measuring Bankfull Width and Depth

Once the edges of the bankfull channel are determined, one can easily measure bankfull width and the average bankfull depth. A tape measure and measuring rod (such as a surveyor's rod) are useful to make these measurements. String wrapped around wooden stakes may also be helpful to more easily mark reference points. The most common situations where these measurements will be helpful are when one needs to:

- Determine a width category for the RMZ rules (see Board Manual Section 7); or
- Determine functional large woody debris size for CMZs in meandering rivers or as part of the LWD placement protocol. See Board Manual Section 26.

To measure bankfull width, attach or have an assistant hold one end of the tape at the bankfull edge and extend the tape to the other edge of the bankfull channel. The outlets of overflow swales, small islands, log jams, backwater eddies or regularly flooded adjacent wetlands may all occur within the bankfull width. In cases where multiple channels exist, such as around a small island, bankfull width is the sum of the individual channel widths along the cross section.

END PORTION OF BOARD MANUAL SECTION 2

TABLES AND DIAGRAMS

Harvest code tables:

Harvest code table to be used with FPA dated 05-14-05

RMZ HARVEST CODES
Inner and Outer Zones
A – Alternate Plan. (*Include Alternate Plan)*
Inner Zone (*Include DFC printouts for each stream segment where standing or down wood will be removed).*
B – No Inner Zone Harvest
C – Hardwood Conversion. *(Include Hardwood Conversion Form)*
D – Thinning from below - Option 1.
E – Leave trees closest to water - Option 2.
F – Salvage
G – Stream-adjacent Parallel Road.
H – Constructing a New Stream Crossing.
I – Road Construction or Day-lighting.
J – Yarding Corridors.
Outer Zone
K – No Outer Zone Harvest
L – Leaving 20 trees per acre
M – Leave trees clumped on sensitive features.
N – Leave trees exchanged for LWD placement strategy. *(Include a copy of the placement plan)*
O – Leave trees exchanged for CMZ basal area.
P – Leave trees exchanged for excess inner zone basal area in conjunction with an Option 2 inner zone harvest.
Q – Salvage

Harvest code table to be used with FPA dated 02-28-05

RMZ HARVEST CODE REFERENCE CHART
Inner and Outer Zones
A – Alternate Plan. (*Include Alternate Plan)*
B – Salvage. *(Include leave tree count in the inner zone. In the outer zone a down wood count may be required).*
Inner Zone (*Include DFC printouts for each stream segment where standing or down wood will be removed).*
C – No Inner Zone Harvest
D – Hardwood Conversion. *(Include Hardwood Conversion Form)*
E – Thinning from below - Option 1.
F – Leave trees closest to water - Option 2.
G – Stream-adjacent Parallel Road.
H – Constructing a New Stream Crossing.
I – Road Construction or Day-lighting.
J – Yarding Corridors.
Outer Zone
K – No Outer Zone Harvest
L – Leaving 20 trees per acre
M – Leave trees clumped on sensitive features.
N – Leave trees exchanged for LWD placement strategy. *(Include a copy of the placement plan)*
O – Leave trees exchanged for CMZ basal area.
P – Leave trees exchanged for excess inner zone basal area in conjunction with an Option 2 inner zone harvest.

Riparian and Wetland Management Tables

Outer zone riparian leave tree requirements

Application	Leave tree spacing	Tree species	Minimum dbh required
Outer zone	Dispersed	Conifer	12" dbh or greater
Outer zone	Clumped	Conifer	12" dbh or greater
Protection of sensitive features	Clumped	Trees representative of the overstory including both hardwood and conifer	8" dbh or greater

No inner zone management RMZ widths for Western Washington

Site Class	RMZ width	Core zone width (measured from outer edge of bankfull width or outer edge of CMZ of water)	Inner zone width (measured from outer edge of core zone)		Outer zone width (measured from outer edge of inner zone)	
			stream width ≤10'	stream width >10'	stream width ≤10'	stream width >10'
I	200'	50'	83'	100'	67'	50'
II	170'	50'	63'	78'	57'	42'
III	140'	50'	43'	55'	47'	35'
IV	110'	50'	23'	33'	37'	27'
V	90'	50'	10'	18'	30'	22'

Option 1. Thinning from below.

Site class	RMZ width	Core zone width (measured from outer edge of bankfull width or outer edge of CMZ of water)	Inner zone width (measured from outer edge of core zone)		Outer zone width (measured from outer edge of inner zone)	
			stream width ≤10'	stream width >10'	stream width ≤10'	stream width >10'
I	200'	50'	83'	100'	67'	50'
II	170'	50'	63'	78'	57'	42'
III	140'	50'	43'	55'	47'	35'
IV	110'	50'	23'	33'	37'	27'
V	90'	50'	10'	18'	30'	22'

Riparian and Wetland Management Tables, continued

Option 2. Leaving trees closest to water.

Site class	RMZ width	Core zone width (measured from outer edge of bankfull width or outer edge of CMZ of water)	Inner zone width				Outer zone width (measured from outer edge of inner zone)	
			stream width ≤10'	stream width ≤10'	stream width >10'	stream width >10'	stream width ≤10'	stream width >10'
				minimum floor distance		minimum floor distance		
			(measured from outer edge of core zone)	(measured from outer edge of core zone)	(measured from outer edge of core zone)	(measured from outer edge of core zone)		
I	200'	50'	84'	30'	84'	50'	66'	66'
II	170'	50'	64'	30'	70'	50'	56'	50'
III	140'	50'	44'	30'	**	**	46'	**

**Option 2 for site class III on streams >10' is not permitted because of the minimum floor (100') constraint.

Down wood requirements for salvage logging in the Inner Zone

Logs w/ a solid core	< 1-ft diameter	1-2 ft diameter	>2 ft diameter	Total
# of logs/acre	85	83	26	194

Wetland Management Zones

Wetland Type	Acres of Nonforested Wetland*	Maximum WMZ Width	Average WMZ Width	Minimum WMZ Width
A (including bogs)	Greater than 5	200 feet	100 feet	50 feet
A (including bogs)	0.5 to 5	100 feet	50 feet	25 feet
A (bogs only)	0.25 to 0.5	100 feet	50 feet	25 feet
B	Greater than 5	100 feet	50 feet	25 feet
B	0.5 to 5			25 feet
B	0.25 to 0.5	No WMZ required	No WMZ required	

*For bogs, both forested and nonforested acres are included.

Overlapping RMZs: Trees in overlapping RMZs count towards the leave trees for each stream in its respective RMZ. i.e. Where the Outer Zone of stream 'A' overlaps the Core Zone of stream 'B', the trees in the overlapping zones count towards the Outer Zone leave tree requirements of stream 'A'. Also see 4(c) on page 3.

Diagram of Stream A RMZ

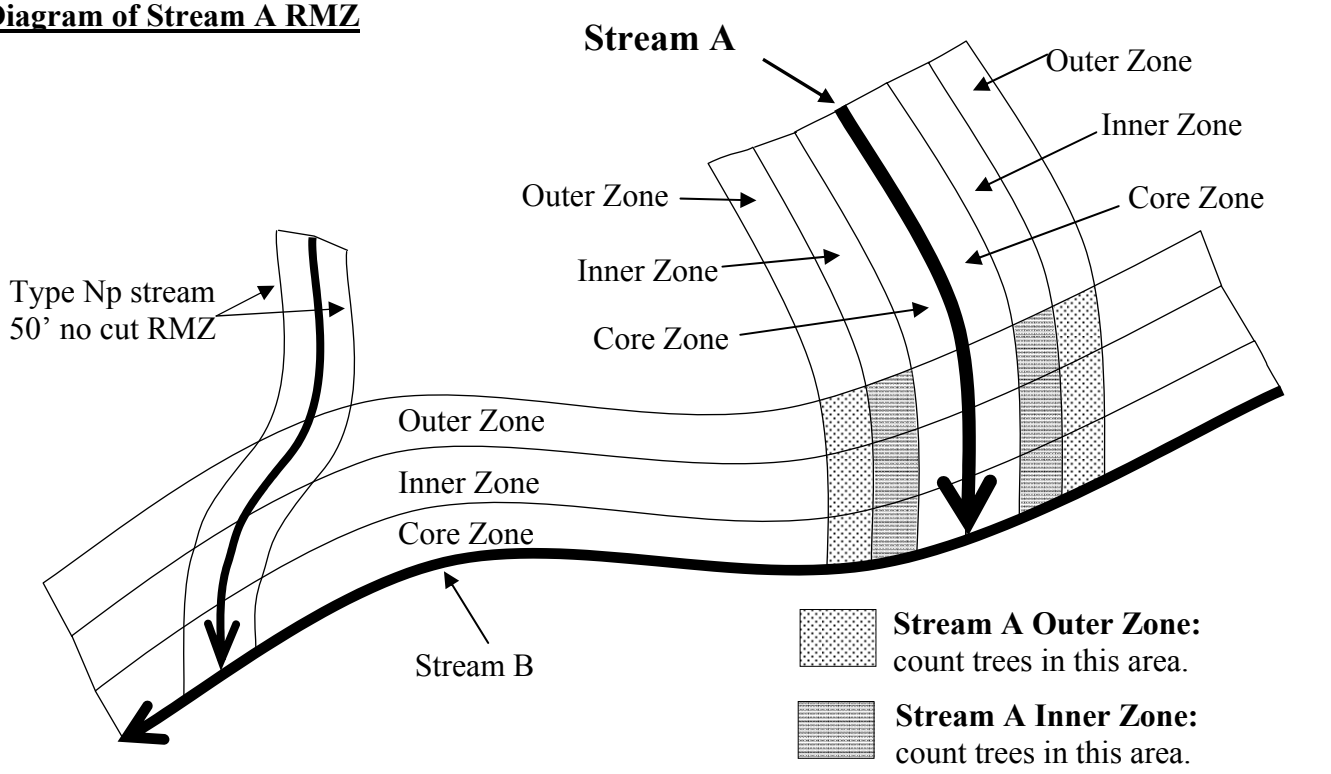
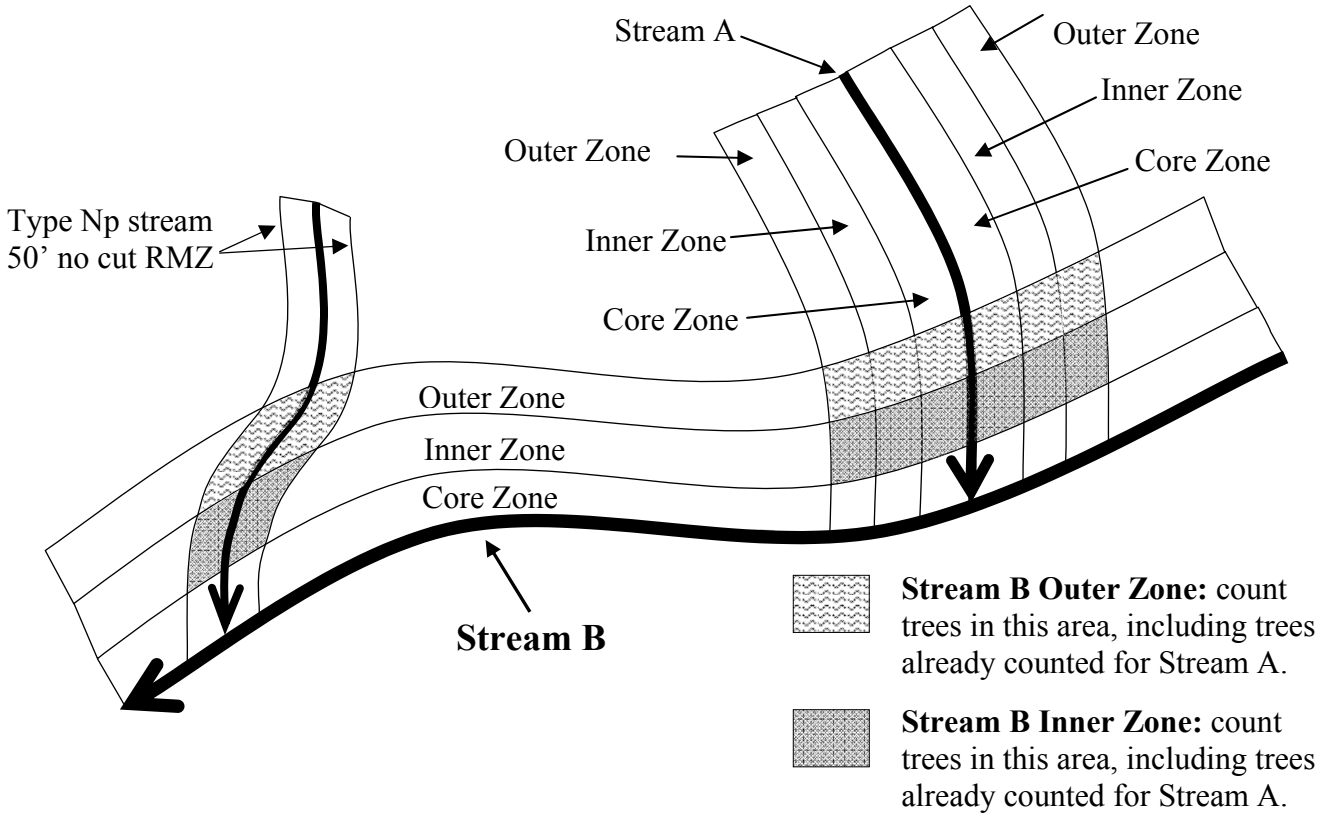


Diagram of Stream B RMZ



FORMULAS AND WORKSHEETS

Formulas

Conversion from slope distance to horizontal distance
Enter slope angle in degrees, multiply by cosine, multiply by slope distance:

HD=(SA)(cos)(SD)

Western Washington Type Np RMZ Worksheet

A. Without regard to ownership, determine the total length of each separate Type Np stream system where at least a portion of the system is within the harvest unit. This includes the branching network of a Type Np system above the confluence with Type S or F water. See WAC 222-30-021.

Note: There can be more than one Type Np system within a harvest unit and each system requires a separate length determination. Use a separate worksheet for each Type Np system.

B. Determine which of the options below best fits the total length determined for a specific Type Np system. Circle the letter next to the best fit (i.e. letter a., b. or c.).

a. If the total Type Np system length (not just the length within the harvest unit) is less than 300': Leave a two-sided, 50' buffer on the entire length of the Type Np water. Show the RMZ on the Activity Map.

STOP, WORKSHEET COMPLETED.

b. If the total length is greater than 300' but less than 1000': Starting at the confluence with Type S or F water, leave a buffer that is the greater of 300' or 50% of the entire length of the Type Np water. In addition, buffer all sensitive sites on the Type Np stream that were not already buffered by the 300' or 50% requirement. Show the RMZ on the Activity Map.

STOP, WORKSHEET COMPLETED.

c. If the total length is greater than 1000': Leave a two-sided, 50' buffer on the first 500' of the Type N stream above the confluence with Type S or F water. Complete i. through vi. below.

i. Determine the total length of the Type Np system. _____Feet

ii. Refer to the table below to determine the minimum % of buffer required on that portion of the Type Np water upstream of the first 500' from the confluence of Type S or F water. _____%

iii. Determine the length of Type Np water within the harvest unit that is upstream of the first 500' from the confluence of Type S or F water. _____Feet

iv. Determine the total length of buffering needed upstream of the first 500' from the confluence of Type S or F water. (% in ii. times length in iii. = required buffer) _____Feet

v. Determine the total length of all required buffering established to protect sensitive sites along the Type Np water within the harvest unit above the first 500' from the confluence of Type S or F water. _____Feet

vi. If the required buffer length in v. is less than the length in iv., determine the length of additional buffering required. (Length in iv. minus length in v. = additional buffer) _____Feet

The buffering must be placed in priority areas. Show the buffers on the Activity Map.

Minimum percent of length of Type Np waters to be buffered when more than 500 feet upstream from the confluence of Type S or F water.

Total length of a Type Np water upstream from the confluence of a Type S or F water.	Percent of length of Type Np water that must be protected with a 50 foot no harvest buffer more than 500 feet upstream from the confluence of a Type S or F water.
1001 – 1300 feet	19%
1301 – 1600 feet	27%
1601 – 2000 feet	33%
2001 – 2500 feet	38%
2501 – 3500 feet	42%
3501 – 5000 feet	44%
Greater than 5000 feet	45%